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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
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Grant E. DUBOIS et al.)	Group Art Unit: 1761
)	
Application No.: 09/838,809)	Examiner: C. Paden
)	
Filed: April 20, 2001)	
)	
For: NON CALORIC FROZEN)	
CARBONATED BEVERAGE)	

Commissioner for Patents
P.O. Box 1450
Washington, DC 20231

Sir:

AMENDMENT UNDER 35 U.S.C. § 1.116

In response to the Final Office Action dated November 5, 2003, the period for response having been extended by the petition and fee filed herewith, please amend the above-identified application, without prejudice, as follows:

AMENDMENTS TO THE SPECIFICATION

Replace paragraphs 8, 9, 10, 36, 40, 46 and 48 with following:

[008] U.S. Patent 4,810,516, by Knog-Chan et al. discloses the use of polyols in the production of reduced calorie chocolate confections. Knog-Chan et al. substitute a nondigestible polyol fatty acid polyester for the natural fat. Knog-Chan et al. also disclose the use of an artificial sweetener plus a partially or wholly nondigestible carbohydrate bulking agent as substitutable for sugar.

[009] European Patent Application NO. 236,288 to ~~Bernhardt~~ discloses Bernhardt discloses edible, wholly or partially nondigestible intermediate melting polyol fatty acid polyesters having certain rheological properties (e.g., viscosity, liquid/solid stability) at body temperatures. These intermediate melting polyol polyesters are disclosed as partial or total fat replacements in food products, including ice cream and other fat-containing frozen desserts.

[010] U.S. Patent No. 6,010,734, to Whelan et al., discloses a low calorie frozen dessert product, which comprises from about 2 to about 20% fat of which about 30 to 100% is edible, wholly or partially nondigestible polyol fatty acid polyesters.

[036] If a FCB is desired having more significantly reduced calories, then alternative freezing point depressants will have to be used. Other freezing point depressants for use according to the present invention include, propylene glycol, glycerol, and sorbitol. According to one embodiment of the present invention, glycerol is used as the freezing point depressant. While glycerol is a full calorie sweetener, it achieves sufficient freezing point depression at sufficiently low levels to result in a beverage having substantial calorie reductions.

[040] Preferred Sugar MNSs for use in the present invention do not have a laxative effect when used in diet beverage syrup. The most preferred Sugar MNS for use in the present invention is erythritol since it exhibits essentially no laxative effect. Erythritol when consumed at moderate levels, e.g., in a FCB, is completely absorbed into the bloodstream from the small intestine and then is quantitatively excreted in the urine unchanged. Other Sugar MNSs such as isomalt, ~~malitel~~ maltitol and lactitol are less preferred since they are not absorbed from the small intestine and they enter the large intestine where they are fermented by anaerobic bacteria to produce short chain fatty acids and gases. Short chain fatty acids have high water binding activity providing possible effects such as soft stools and diarrhea.

[046] Freezing Point Depression for water is

$$\Delta T = K_F m \quad \Delta T = K_F m$$

where ΔT is the change in freezing point temperature in degrees Celsius, K_F is the molal freezing point depression constant and is 1.855 for water and m is the molal concentration of solute in water. Now, if one takes a sucrose-sweetened beverage formulation and, for the purpose of simplicity assumes that all ingredients are held constant in concentration except for the sweetener concentration, then the molal concentration of the new reduced calorie sweetener system (e.g., erythritol and aspartame) must equal the molal concentration of sucrose in the original formulation. Since the molecular weight of sucrose is 342 and if the sucrose concentration in the original beverage was 10% (w/v), then the original beverage contained approximately 0.3 m of sucrose. To achieve the same freezing point depression, the erythritol and aspartame must have a total concentration of 0.3 m. Since aspartame will be present at only about 0.001 m, erythritol must be present at about 0.299 m. Since aspartame plays

such a negligible role in freezing point depression, it is a reasonable approximation that all of the freezing point depression comes from erythritol. Thus, to get the same freezing point depression as 10% sucrose, i.e., 0.3 m sucrose, one must use 0.3 m erythritol. The molecular weight of erythritol is 122, thus requiring 36.6[[.]] grams of erythritol per 1000 g of water, approximately 3.5% (w/v). The resulting FCB would be non-caloric.

[048] A reduced calorie beverage syrup according to the present invention was produced by combining 3.5% w/v of erythritol into cola flavored syrup and then reducing the level ~~the of~~ of the high-potency non-caloric sweetener, e.g., aspartame or saccharin by 1/3. This formulation resulted in syrup that's freezing point was depressed thereby achieving the production of a slushy-like product inside the frozen carbonated drink dispenser.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A substantially reduced calorie [or non-caloric] frozen carbonated dispenser beverage comprising:
 - (a) a substantially reduced calorie [or non-caloric] beverage syrup containing the freezing point depressant erythritol;
 - (b) water; and
 - (c) carbon dioxide.
2. (Previously Presented) The beverage according to claim 1, wherein the freezing point depressant further comprises a Sugar MNS chosen from at least one of isomalt, maltitol, lactitol, and fructo-oligosaccharide.
3. (Cancelled)
4. (Previously Presented) The beverage according to claim 1, wherein the beverage syrup contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.
5. (Currently Amended) A [non-caloric] frozen carbonated dispenser beverage comprising:
 - (a) a beverage syrup containing a high-potency non-caloric sweetener;
 - (b) the freezing point depressant erythritol; and
 - (c) water.
6. (Previously Presented) The beverage according to claim 5, wherein the freezing point depressant further comprises a Sugar MNS selected from at least one of isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.
7. (Cancelled)

8. (Previously Presented) The beverage according to claim 5, wherein the high-potency, non-caloric sweetener is chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

9. (Currently Amended) A method of making a substantially reduced calorie [or non-caloric] frozen carbonated dispenser beverage comprising:

combining at a reduced temperature, a substantially reduced calorie [or non-caloric] beverage syrup containing the freezing point depressant erythritol with water; and carbon dioxide.

10. (Previously Presented) The method according to claim 9, wherein the freezing point depressant further comprises a Sugar MNS chosen from at least one of isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

11. (Cancelled)

12. (Cancelled)

13. (Previously Presented) A reduced calorie frozen carbonated dispenser beverage having a given freezing point comprising:

(a) a reduced calorie beverage syrup containing a mixture of a non-caloric sweetener and a low caloric sugar, the low caloric sugar acting as a freezing point depressant, as compared to freezing point depressant characteristics of the non-caloric sweetener;

(b) water; and

(c) carbon dioxide

wherein the given freezing point is determined from a reference molal concentration of high-caloric sugar in a standard frozen carbonated beverage for achieving said given freezing point, and the amount of low-caloric sugar in the mixture is

selected to achieve substantially the same molal concentration thereof as the reference molal concentration.

14. (Previously Presented) The beverage of claim 13, wherein the ratio of low caloric sugar to non-caloric sweetener in the mixture is selected to achieve said given freezing point.

15. (Cancelled)

16. (Previously Presented) The beverage according to claim 13, wherein the the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

17. (Previously Presented) The beverage according to claim 14, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

18. (Cancelled)

19. (Previously Presented) The beverage according to claim 16, wherein the Sugar MNS is erythritol.

20. (Previously Presented) The beverage according to claim 16, wherein the beverage syrup contains a high-potency non-caloric sweetener selected from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

21. (Previously Presented) A reduced calorie frozen non-carbonated dispenser beverage having a given freezing point comprising:

(a) a beverage syrup containing a mixture of non-caloric sweetener and a low caloric sugar, said low-caloric sugar acting as a freezing point depressant, as compared to freezing point depressant characteristics of the non-caloric sweetener; and

(b) water

wherein a ratio of low-caloric sugar to non-caloric sweetener in the mixture is selected to achieve said given freezing point.

22. (Cancelled)

23. (Previously Presented) The beverage of claim 21, wherein the given freezing point is determined from a reference molal concentration of high-caloric sugar in a standard frozen carbonated beverage for achieving said given freezing point, and the amount of low-caloric sugar in the mixture is selected to achieve substantially the same molal concentration thereof as the reference molal concentration.

24. (Previously Presented) The beverage according to claim 21, wherein the low caloric sugar comprises a Sugar MNS selected from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

25. (Cancelled)

26. (Previously Presented) The beverage according to claim 23, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

27. (Previously Presented) The beverage according to claim 24, wherein the Sugar MNS is erythritol.

28. (Previously Presented) The beverage according to claim 24, further comprising a non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, or sucralose.

29. (Previously Presented) A method of making a reduced calorie frozen carbonated dispenser beverage having a given freezing point comprising:

combining a reduce calorie beverage syrup containing a mixture of a non-caloric sweetener and a low caloric sugar, said low caloric sugar acting as a freezing point

depressant, as compared to freezing point depressant characteristics of the non-caloric sweetener; water and carbon dioxide

wherein a ratio of low caloric sugar to non-caloric sweetener in the mixture is selected to achieve said given freezing point.

30. (Cancelled)

31. (Previously Presented) The method of claim 29, wherein the given freezing point is determined from a reference molal concentration of high-caloric sugar in a standard frozen carbonated beverage for achieving said freezing point, and the amount of low caloric sugar in the mixture is selected to achieve substantially the same molal concentration thereof as the reference molal concentration.

32. (Previously Presented) The method according to claim 29, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

33. (Previously Presented) The method according to claim 29, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

34. (Previously Presented) The method according to claim 31, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

35. (Previously Presented) The method according to claim 32, wherein the Sugar MNS is erythritol.

36. (Previously Presented) The new beverage according to claim 32, wherein the beverage syrup contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

37. (Previously Presented) A method of controlling the freezing point depressant characteristics of a beverage syrup for a frozen dispenser beverage to be mixed with a diluent comprising the steps of:

(a) blending a non-caloric sweetener and a low-caloric sugar, said low-caloric sugar acting as a freezing point depressant for the diluent compared to freezing point depressant characteristics of the non-caloric sweetener;

(b) controlling the ratio of low-caloric sugar to non-caloric sweetener to achieve a given freezing point of the diluent and syrup mixture; and

wherein the given freezing point is determined from a reference molal concentration of high-caloric sugar in a standard frozen carbonated beverage for achieving said given freezing point, and the amount of low caloric sugar in the mixture is selected to achieve substantially the same molal concentration thereof as the reference molal concentration.

38. (Cancelled)

39. (Previously Presented) The method of claim 37, wherein said ratio is up to 1/3.

40. (Previously Presented) The method of claim 37, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

41. (Cancelled)

42. (Previously Presented) The method of claim 39, wherein the low caloric sugar comprises a Sugar MNS chosen from at least one of erythritol, isomalt, maltitol, lactitol, and fructo-oligosaccharide sweetener.

43. (Previously Presented) The method of claim 40, wherein the beverage syrup contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

44. (Previously Presented) A reduced calorie frozen non-carbonated dispenser beverage comprising:

(a) a beverage syrup containing a high-potency non-caloric sweetener and a freezing point depressant ; and

(b) water,

wherein the freezing point depressant comprises a sugar MNS chosen from at least one of propylene glycol, glycerol, and sorbitol.

45. (Previously Presented) The beverage according to claim 44, wherein the freezing point depressant comprises a sugar MNS chosen from at least two of propylene glycol, glycerol, and sorbitol.

46. (Previously Presented) The beverage according to claim 44, wherein the freezing point depressant comprises a sugar MNS including propylene glycol, glycerol, and sorbitol.

47. (Previously Presented) The beverage according to claim 44, wherein the beverage syrup contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

48. (Previously Presented) The beverage according to claim 47, wherein the high-potency non-caloric sweetener includes sucralose.

49. (Previously Presented) The beverage according to claim 45, wherein the beverage syrup contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

50. (Previously Presented) The beverage according to claim 49, wherein the high-potency non-caloric sweetener includes sucralose.

51. (Previously Presented) The beverage according to claim 46, wherein the beverage syrup contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

52. (Previously Presented) The beverage according to claim 51, wherein the high-potency non-caloric sweetener includes sucralose.

53. (Previously Presented) A method of depressing the freezing point of a reduced calorie beverage syrup comprising:

preparing a reduced caloric beverage syrup by replacing up to one third of a high-potency non-caloric sweetener with a freezing point depressant chosen from at least one of propylene glycol, glycerol and sorbitol.

54. (Previously Presented) The method according to claim 53, wherein the high-potency non-caloric sweetener includes sucralose.

55. (Previously Presented) The beverage according to claim 13, wherein the low caloric sugar is chosen from at least one of propylene glycol, glycerol, and sorbitol.

56. (Previously Presented) The beverage according to claim 55, wherein the low caloric sugar is chosen from at least two of propylene glycol, glycerol, and sorbitol.

57. (Previously Presented) The beverage according to claim 55, wherein the low caloric sugar includes propylene glycol, glycerol, and sorbitol.

58. (Previously Presented) The beverage according to claim 55, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

59. (Previously Presented) The beverage according to claim 58, wherein the high-potency non-caloric sweetener includes sucralose.

60. (Previously Presented) The beverage according to claim 56, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

61. (Previously Presented) The beverage according to claim 60, wherein the high-potency non-caloric sweetener includes sucralose.

62. (Previously Presented) The beverage according to claim 57, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

63. (Previously Presented) The beverage according to claim 62, wherein the high-potency non-caloric sweetener includes sucralose.

64. (Previously Presented) The beverage according to claim 21, wherein the low caloric sugar is chosen from at least one of propylene glycol, glycerol, and sorbitol.

65. (Previously Presented) The beverage according to claim 64, wherein the low caloric sugar is chosen from at least two of propylene glycol, glycerol, and sorbitol.

66. (Previously Presented) The beverage according to claim 64, wherein the low caloric sugar includes propylene glycol, glycerol, and sorbitol.

67. (Previously Presented) The beverage according to claim 64, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

68. (Previously Presented) The beverage according to claim 67, wherein the high-potency non-caloric sweetener includes sucralose.

69. (Previously Presented) The beverage according to claim 65, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

70. (Previously Presented) The beverage according to claim 69, wherein the high-potency non-caloric sweetener includes sucralose.

71. (Previously Presented) The beverage according to claim 66, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

72. (Previously Presented) The beverage according to claim 71, wherein the high-potency non-caloric sweetener includes sucralose.

73. (Previously Presented) The beverage according to claim 29, wherein the low caloric sugar is chosen from at least one of propylene glycol, glycerol, and sorbitol.

74. (Previously Presented) The beverage according to claim 73, wherein the low caloric sugar is chosen from at least two of propylene glycol, glycerol, and sorbitol.

75. (Previously Presented) The beverage according to claim 73, wherein the low caloric sugar includes propylene glycol, glycerol, and sorbitol.

76. (Previously Presented) The beverage according to claim 73, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

77. (Previously Presented) The beverage according to claim 76, wherein the high-potency non-caloric sweetener includes sucralose.

78. (Previously Presented) The beverage according to claim 74, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

79. (Previously Presented) The beverage according to claim 78, wherein the high-potency non-caloric sweetener includes sucralose.

80. (Previously Presented) The beverage according to claim 75, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

81. (Previously Presented) The beverage according to claim 80, wherein the high-potency non-caloric sweetener includes sucralose.

82. (Previously Presented) The beverage according to claim 37, wherein the low caloric sugar is chosen from at least one of propylene glycol, glycerol, and sorbitol.

83. (Previously Presented) The beverage according to claim 82, wherein the low caloric sugar is chosen from at least two of propylene glycol, glycerol, and sorbitol.

84. (Previously Presented) The beverage according to claim 82, wherein the low caloric sugar includes propylene glycol, glycerol, and sorbitol.

85. (Previously Presented) The beverage according to claim 82, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

86. (Previously Presented) The beverage according to claim 85, wherein the high-potency non-caloric sweetener includes sucralose.

87. (Previously Presented) The beverage according to claim 83, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

88. (Previously Presented) The beverage according to claim 87, wherein the high-potency non-caloric sweetener includes sucralose.

89. (Previously Presented) The beverage according to claim 84, wherein the beverage contains a high-potency non-caloric sweetener chosen from at least one of aspartame, saccharin, acesulfame-K, cyclamate, and sucralose.

90. (Previously Presented) The beverage according to claim 89, wherein the high-potency non-caloric sweetener includes sucralose.

91. (Cancelled)

92. (Previously Presented) The beverage according to claim 1, wherein said beverage syrup further comprises tagatose.

93. (Previously Presented) The beverage according to claim 4, wherein said beverage syrup further comprises tagatose.

94. (Previously Presented) The beverage according to claim 5, wherein said beverage syrup further comprises tagatose.

95. (Previously Presented) The beverage according to claim 8, wherein said beverage syrup further comprises tagatose.

96. (Previously Presented) The beverage according to claim 9, wherein said beverage syrup further comprises tagatose.

97. (Previously Presented) The beverage according to claim 13, wherein said beverage syrup further comprises tagatose.

98. (Previously Presented) The beverage according to claim 19, wherein said beverage syrup further comprises tagatose.

99. (Previously Presented) The beverage according to claim 21, wherein said beverage syrup further comprises tagatose.

100. (Previously Presented) The beverage according to claim 27, wherein said beverage syrup further comprises tagatose.

101. (Previously Presented) The beverage according to claim 35, wherein said beverage syrup further comprises tagatose.

102. (Previously Presented) The beverage according to claim 37, wherein said beverage syrup further comprises tagatose.

103. (new) The beverage according to claim 1, wherein the beverage is non-caloric.

104. (new) The beverage according to claim 5, wherein the beverage is non-caloric.

105. (new) The method according to claim 9, wherein the beverage syrup is a non-caloric beverage syrup.